

**EPA Radiation and Indoor Environments National
Laboratory Scanner Van Survey of the Yerington Mine Site
and Surrounding Areas**

**Yerington, Nevada
April 18 - 26, 2005**



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Introduction

At the request of EPA Region 9 a scan of the Yerington Mine Site and surrounding areas was performed with the Radiation and Indoor Environments (R&IE) National Laboratory's Scanner Van to locate and assess anomalously high gamma-ray emitting sources. The scan took place in late April of 2005. Compilations of the map data and a discussion of the findings are presented in this report.

Scan Methodology

Gamma-ray surveys conducted with the R&IE Scanner Van are used for the identification of areas of elevated gamma-ray radioactivity relative to the surrounding environment. Information about the Scanner Van principals and operations can be found in the Yerington Mine Project Quality Assurance Project Plan and the Sampling and Analysis Plan (Ref. 1 and 2). Scans are performed with a sodium iodide scintillation detector that is shielded so that the field of view is limited to the right side of the van. Live time data in the form of gamma-ray interactions with the detector in units of counts per second (cps) are superimposed on ariel photographs of the scan area as the van moves. The data is recorded electronically for later processing. In some instances handheld Ludlum microR meters are used at site locations to obtain exposure rates.

Results

A baseline activity (also referred to as the "background" in this survey) was selected after evaluating collecting ambient levels at several locations believed to be free of anomalous gamma-emitting sources. Based on the range of levels seen a count rate of 264 cps was chosen. This baseline was compared daily to data collected during quality control checks in the town of Yerington and found to be comparable in magnitude. Additionally, preliminary scans showed that count rates in areas where sediments associated with the Walker River are predominant were somewhat lower than in the surrounding environments. Because the selected baseline was representative of these low-background areas it was decided that it would be used for all scans as an added precautionary measure.

The continuous count rate data are shown in this report as colors which represent incremental

count rates. Successive count rate ranges of seven standard deviations (17 cps each) above the baseline are represented by colors green (baseline and below to 383 cps), yellow (383 to 502 cps), red (502 to 621), and on where applicable, magenta (621 to 740 cps) and purple (740 cps and above). It should be kept in mind, however, that the data is stored numerically and the color representations are intended only to show only relative differences. The data are to be interpreted as screening information only. Experience in the interpretation of scanner van data has indicated that activities several times baseline are of concern, however, for this purposes of this study consistent readings above the threshold of the yellow limit were noted and investigated throughout the scans as described below.

The Yerington Mine Site

Continuous count rates above 502 cpm were first encountered in the lower processing unit immediately north of the iron precipitate launder unit (Fig.1A, 1). The activity appeared to be related to soils in the basin and berms of the area and may have been deposited as residual sediments in impoundments. Further scans of the processing and facility areas showed the highest readings of the study north and south of the iron precipitate launder unit (Fig.1A, 2). The strongest activity was found on the south side of the unit and had been previously designated as a radioactive area. Scanner van count rates exceeded 7500 cps and the gamma radioactivity appeared to be associated with metal piping and other debris. A microR reading on one piece of pipe at the location exceeded 5 mR/hr on contact.

The acid solution storage tank area (Fig.1A, 3) south of the launder unit had highly localized areas that exceeded 2700 cps. The activity appeared to be associated with debris and single point sources on the ground that may be indicative of buried materials or pipe scale. MicroR readings at these locations varied from 1 mR/hr to 3 mR/hr on contact.

The road scan north of the FX Pad along the oxide tailings pile (Fig.1B, 1) showed multiple locations with readings greater than 502 cps east of the road. This is due to the effect of the mass of material and close proximity of the tailings pile to the right side of the van (and the detector) on the return scan while moving south.

The road northwest through the evaporation basins showed readings as high as 1000 cps even though the road was elevated above the floor of the basins partially obscuring the line of sight for the scanner van's detector. The activity was recorded on both sides of the road (Fig. 1C, 1) and appeared to be associated with a fine red deposit. A cursory scan of the capped portion of the sulfide tailings in the northeast portion of the mine site (Fig.1C, 2) showed readings in the 383 to 502 cps range but no higher. Many of the readings were associated with small pits that had been dug into the sulfide tailing cover material to look for clay deposits.

A scan of the W-3 Waste Rock and Slot Heap Leach Pad area of the site was conducted in a clockwise direction to observe activity from the waste piles. Readings in the 502 to 740 cps range were observed adjacent to the main mine access road (Fig.1D, 1) where the right side of

the van passed closely to the road cut on the side of the hill. Readings above 383 cps were observed at other similar portions of the road.

MacArthur Pit and Haul Road

The east side of the MacArthur Pit haul road was scanned (Fig.2). Activities in the 383 to 502 range were detected where the van past closely to material on the road side. A return scan (west side) was not conducted due to the condition of the road. The MacArthur Pit itself (Fig. 3) also showed some areas with readings of 383 to 502 cps where the van passed closely to the pit walls.

The Wabuska Rail Spur

The Wabuska rail spur, which lies approximately 10 miles north of Yerington on Highway 95A and was used to transport product and other materials to and from the mine, was scanned as completely as the existing roads would allow (Fig.4). No notable activities were detected.

The Yerington Paiute Indian Reservation

A scan of the accessible roads of the Yerington Paiute Indian Reservation was conducted (Fig.5). No activities exceeding 383 cps were detected in the rural or suburban locations.

Mesa and the Sunset Hills Drive Area

Accessible roads in the Mesa and Sunset Hills Drive area were scanned (Fig.6). Some areas of activity in the 383 to 502 cps were found on the western portion and were consistently associated with the rock of the rising hillside. One other location had readings in that range that were associated with some granitic decorative rock in front of a residence and adjacent to the roadway.

The Penrose Development Area

All roadways in the Penrose community were scanned as was Scarsdale Drive to its south (Fig.7). No notable activities were found.

Luzier Road and Valley View Estates to the West

Luzier Road west from Highway 95 and roadways northwest of the mine site (Pine Street, Locust Drive, Mason Pass Road, and others) were scanned. Several areas on the far western side showed activities greater than 383 cps that were associated with the exposed rock of the hillside. Readings taken in the area northeast of the intersection of Luzier and Mason (Fig.8, 1) registered approximately 25 :R/hr at a one meter height apparently due to fill material used for the road. The scanner van recorded readings in the 383 to 502 cps range at the location. At the request of a resident, a cursory walkover of a property on Juniper Court showed microR readings of between 15 and 20 :R/hr at a one meter height.

Weed Heights and Access Roads

The community of Weed Heights was scanned with no notable readings. The access roads were also scanned. Boatwright Lane (to the southeast) showed readings in the 383 to 502 range on both sides of the road, and readings as high as 600 cps were detected on Burch Drive (to the northeast) due to the proximity of exposed rock to the side of the van (Fig.9, 1). The later were taken near the same location where high rates were found during the east processing area scan (Fig.1D, 1).

Locations in Mason Valley South of Yerington

Several roads south of Yerington were scanned, including Cremetti Lane and Pursel Lane east of Route 208, Osborne Lane and Osborne Drive east of Route 208, Snyder Lane east of Highway 339, Rebecca Road and Zachary Road west of Highway 339, Hot Plant Road and Sheltered Hills Drive west of Highway 339, and Fourth Avenue and Bluestone Avenue in the town of Mason, Nevada. The only notable count rates (383 to 502 cps) were encountered on Cremetti Lane where road cuts were in close proximity to the side of the van (Fig.10, 1).

Yerington, Nevada and Adjacent Roadways

Sections of the town of Yerington were scanned as time allowed, as were Highway 95A to the junction of Highway 339 and Highway 339 south to West Bridge Street (Fig.11). A gravel lot in the rest area on the east side of Highway 339 showed rates of 383 to 502 cps. MicroR readings in the area taken at a one meter height were approximately 25 :R/hr and may have been due to fill material used for the lot. A gravel lot adjacent to a softball field and Highway 95A in the northeast corner of town showed count rates of 383 to 502 cps and microR readings of about 20 to 25 :R/hr. A decorative granitic rock display showed a slightly elevated reading in the 383 to 502 cps range when the van was in close proximity. Some other readings in the same range were detected when the van past closely to block walls in some alleyways.

Schurz, Nevada and Roadways to the Southeast

The town of Schurz and the rural roads to the southeast of town on the Walker River Paiute Indian Reservation were scanned (Fig.12 and Fig.13). The parking lot of the combined school on highway was also scanned. Some elevated readings in the range of 383 to 502 cps were encountered toward the south of town near Highway 95A and were associated with rocks from the adjoining mountainside. No other notable rates were detected.

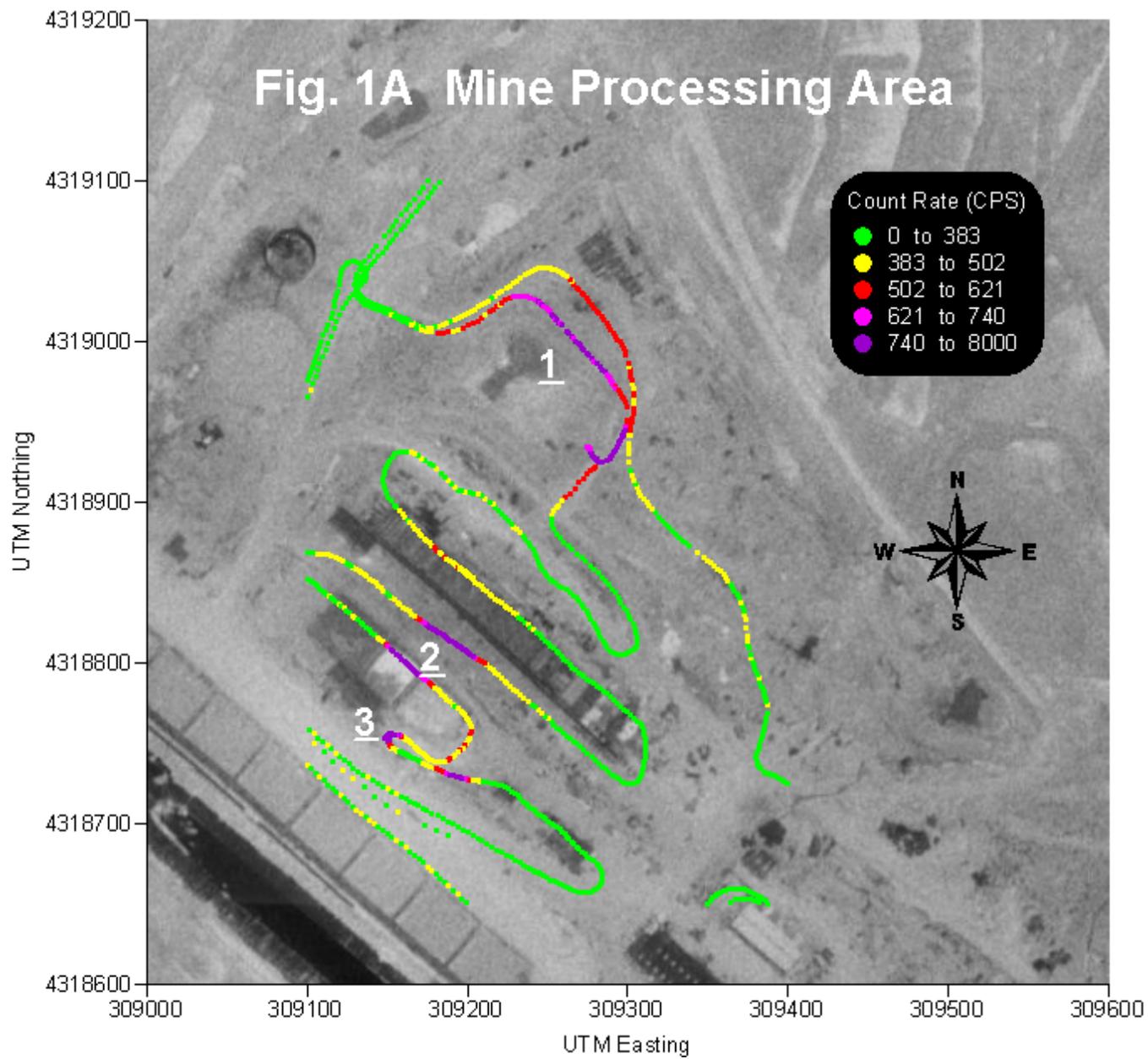
Summary

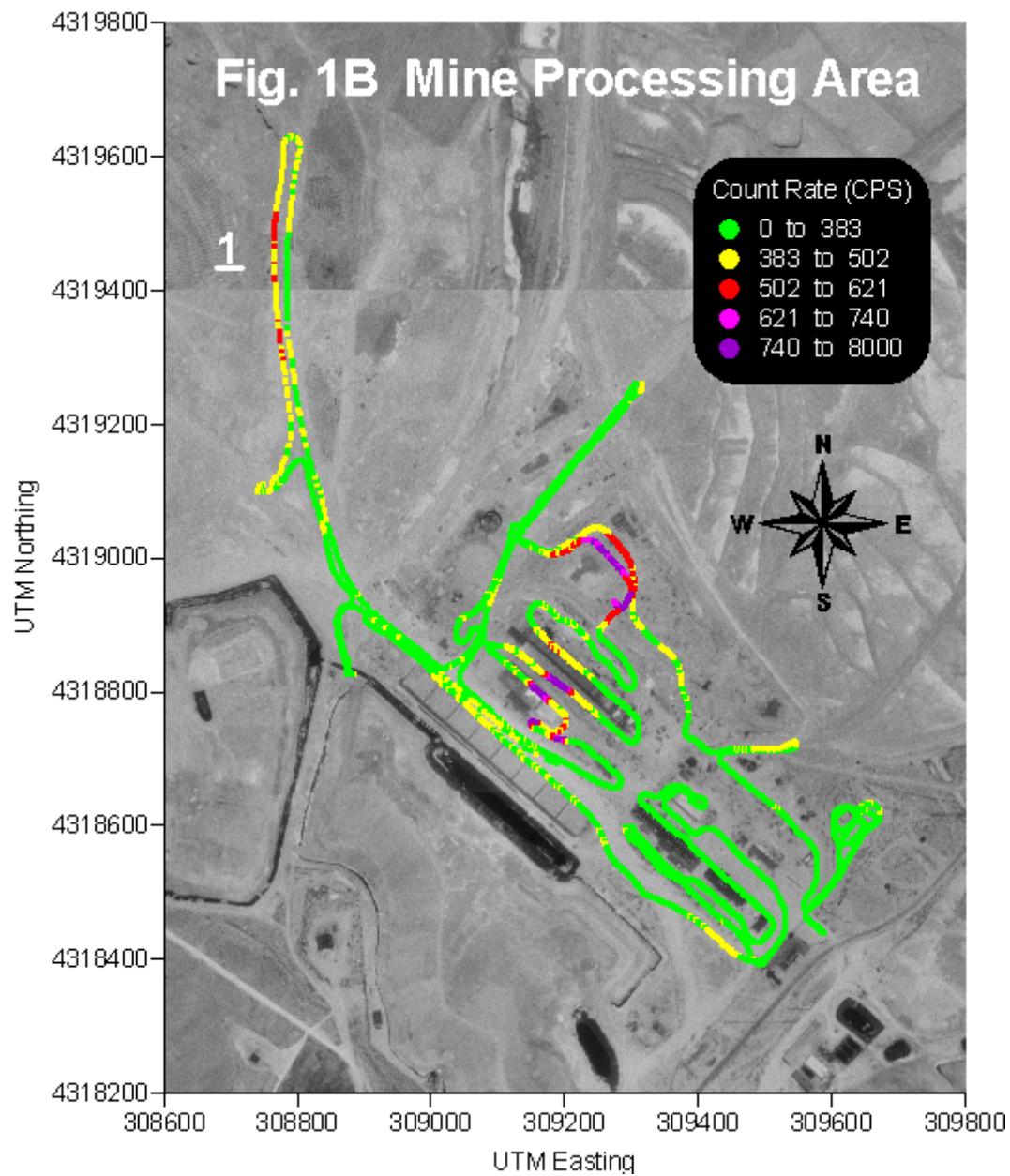
This gamma-ray scan of the Yerington area indicates that sources significantly higher than the ambient background of the surrounding areas lie on the mine site in the processing areas (with activities exceeding 5mR/hr on contact) and the old evaporation basin area on the northeast side of the site. The scanner van detected no anomalously high locations at any of the surrounding areas. In general, the lowest readings were found in areas associated with Walker River sediments, such as in the Town of Yerington and the central Mason Valley, and slightly higher readings were recorded in areas approaching the surrounding mountainsides probably due to the presence of naturally occurring radioactive materials in outcrops or roadcuts. This also appeared to be the case in the town of Schurz on the Walker River Paiute Indian Reservation where slightly higher readings were encountered on the southern parts of town where granitic rocks were observed.

It is important to note that this scan does not represent a comprehensive survey of the areas in question. The Scanner Van is limited by access and the results indicate only the relative presence or absence of gamma-ray emitting sources. Other radioactive sources (sources that do not emit gamma-rays) and non-radioactive pollutants are not addressed in this study.

References

1. *Quality Assurance Project Plan, Scanner Van Survey, Yerington Mine Site and Surrounding Areas, Yerington, Nevada, April, 2005.* Submitted to EPA Region 9 April, 2005.
2. *Scanner Van Survey of Yerington Mine Site and Surrounding Areas of Yerington, Nevada Sampling and Analysis Plan.* Submitted to EPA Region 9 April, 2005.





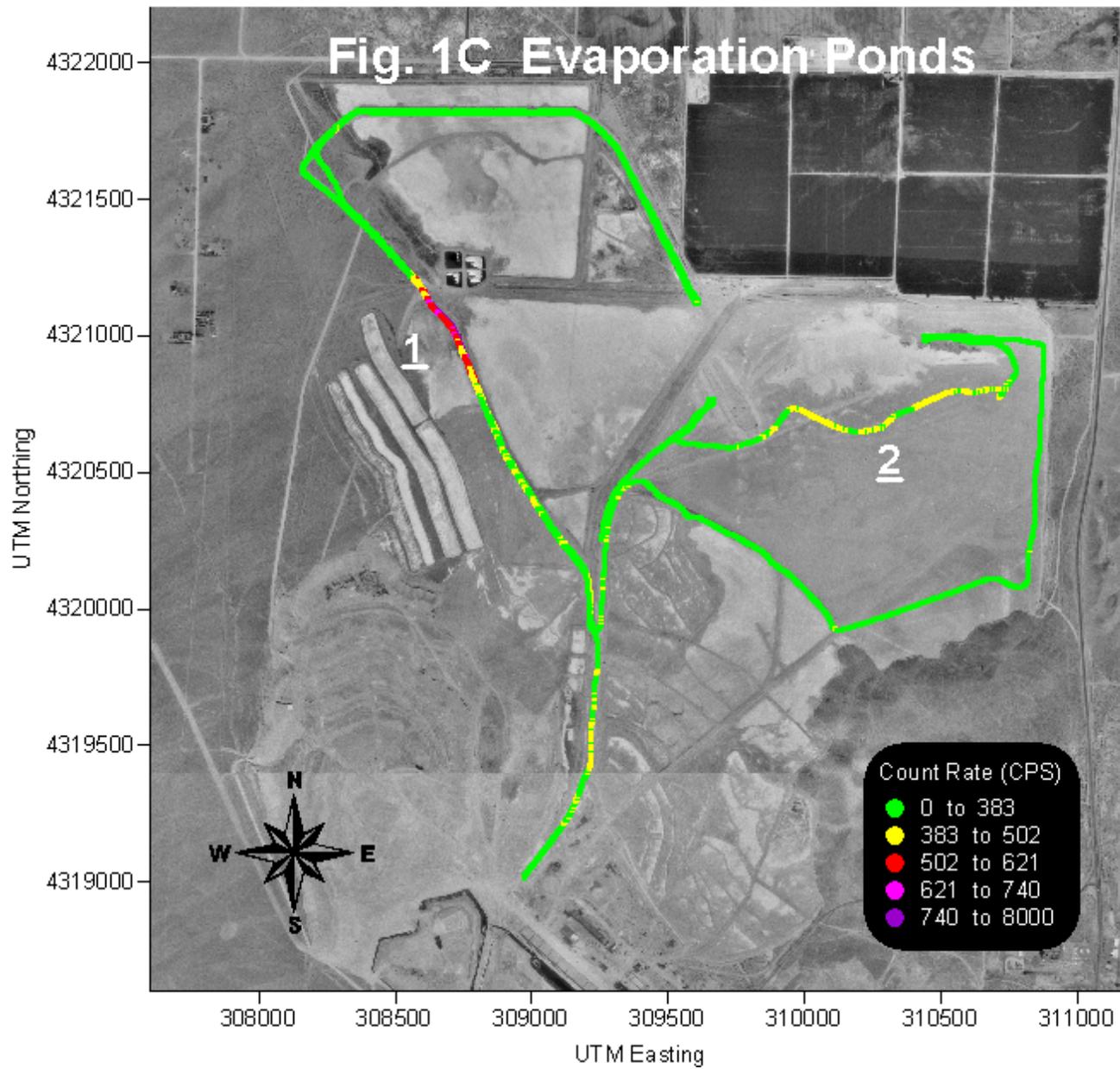


Fig. 1D W-3 Waste Rock and Slot Heap Leach Pad Area

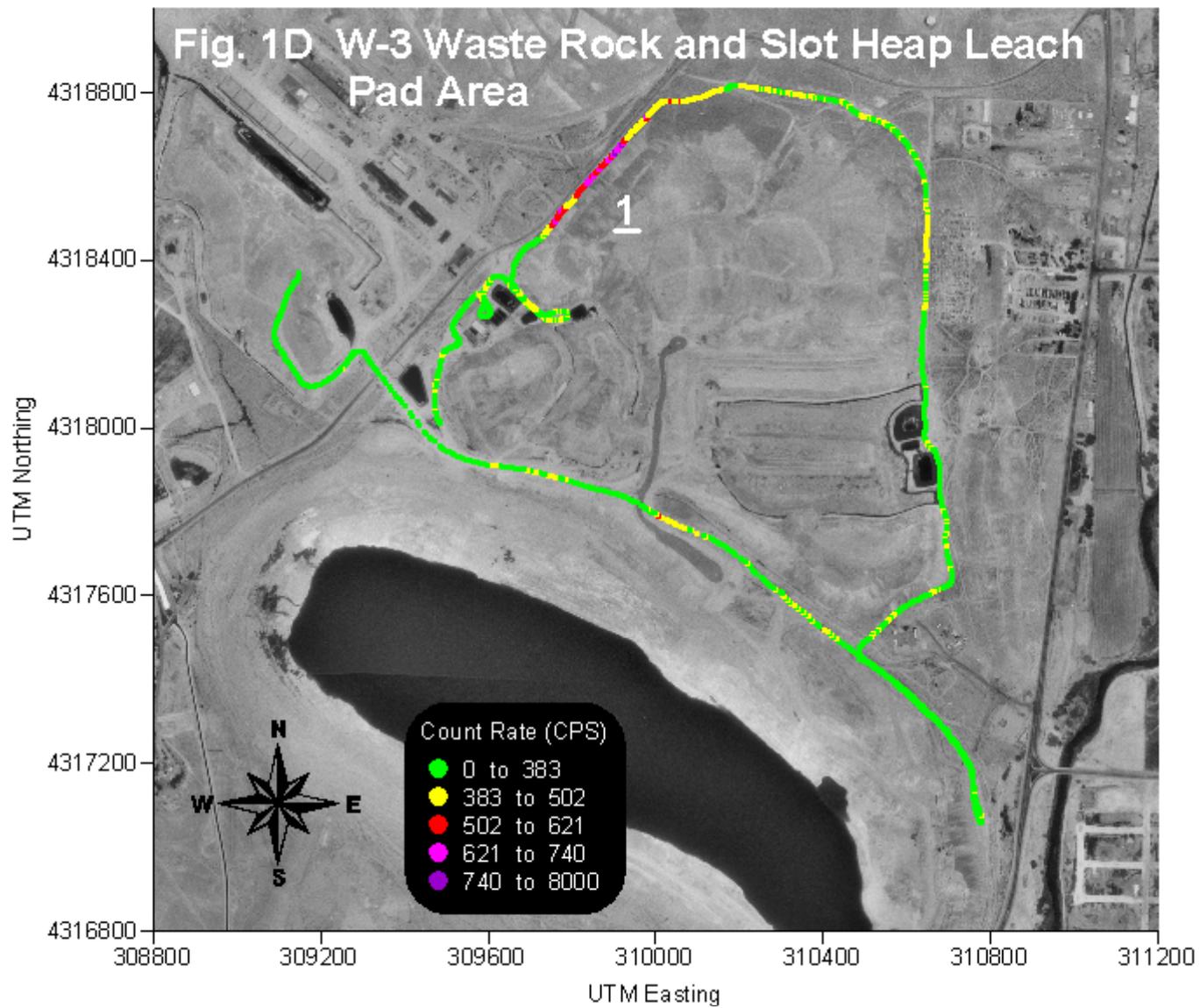


Fig. 2 MacArthur Pit Haul Road

